

**Amendment and Response**

Applicant: Cory Watkins

Serial No.: 10/623,282

Filed: July 18, 2003

Docket No.: A126.112.102

Title: INSPECTION TOOL WITH PARTIAL FRAMING/WINDOWING CAMERA

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**REMARKS**

This is responsive to the Non-Final Office Action mailed September 12, 2006. In that Office Action, the Examiner provisionally rejected claims 1-7 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent Application Serial No. 10/623,283, in view of Roberts, U.S. Patent No. 5,541,654 ("Roberts"). Claim 8 was provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 8 of U.S. Patent Application Serial No. 10/623,283. Claims 9-16 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 9-15 of U.S. Patent Application Serial No. 10/623,283 in view of Roberts, U.S. Patent No. 5,541,654 ("Roberts"). Claims 17-20 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 16-19 of U.S. Patent Application Serial No. 10/623,283 in view of Roberts.

The Examiner objected to the Declaration and deemed the Declaration to be defective because page 2 of the Declaration was not signed.

Claims 5-7, 14-16, and 18-20 were objected to due to minor informalities.

Claims 1-3 and 8-12 were rejected under 35 U.S.C. §102(b) as being anticipated by Roberts. Claims 1-5, 8-14, 17, and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Neumann, U.S. Patent No. 6,693,664 and Roberts. Claims 6, 15, and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Neumann and Roberts, and further in view of Tsuneta et al., U.S. Patent No. 6,570,156 ("Tsuneta"). Claims 7, 16, and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Neumann and Roberts, and further in view of Isogai et al., U.S. Patent No. 6,457,232 ("Isogai").

With this Response, claims 4 and 13 have been cancelled, and claims 1, 5-8, 14-16, and 18-20 have been amended. Claims 1-3, 5-12, and 14-20 remain pending in the application and are presented for reconsideration and allowance.

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**Rejections under Doctrine of Obviousness-Type Double Patenting**

The Examiner provisionally rejected claims 1-7 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent Application Serial No. 10/623,283, in view of Roberts, U.S. Patent No. 5,541,654 ("Roberts"). Claim 8 was provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 8 of U.S. Patent Application Serial No. 10/623,283. Claims 9-16 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 9-15 of U.S. Patent Application Serial No. 10/623,283 in view of Roberts, U.S. Patent No. 5,541,654 ("Roberts"). Claims 17-20 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 16-19 of U.S. Patent Application Serial No. 10/623,283 in view of Roberts. Applicants have submitted herewith a Terminal Disclaimer filed under 37 C.F.R. 1.321 along with the appropriate fees to obviate the Examiner's double patenting rejection.

**Objection to Declaration**

In the Office Action, the Examiner indicated that the Oath or Declaration was defective as the second page of the Oath or Declaration was not signed. In response to the Notice to File Missing Parts mailed on November 18, 2003, Applicant submitted a signed declaration on December 31, 2003. A courtesy copy of the papers that were filed on December 31, 2003, including a copy of the executed Declaration, are submitted herewith. Applicant respectfully requests removal of the objection to the Declaration.

**Objection to Claims**

Claims 5-7, 14-16, and 18-20 were objected to due to informalities. Claims 5-7, 14-16, and 18-20 have been amended as shown above to address the Examiner's

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objections. Withdrawal of the objection to claims 5-7, 14-16, and 18-20 is respectfully requested.

**Claim Rejections under 35 U.S.C. § 102**

Claims 1-3 and 8-12 were rejected under 35 U.S.C. §102(b) as being anticipated by Roberts. Amended independent claim 1 recites "an inspection system including at least a camera with the ability to selectively readout a number of rows and columns, wherein the inspection system is configured to inspect semiconductor substrates". Amended independent claim 8 recites "an inspection device including at least a camera with the ability to selectively readout pixels of an imager of the camera, wherein the inspection device is configured to inspect semiconductor substrates". There is no teaching or suggestion in Roberts regarding an inspection system or device that is configured to inspect semiconductor substrates.

In view of the above, independent claims 1 and 8 are not taught or suggested by Roberts. In addition, dependent claims 2-3 and 9-12, which further limit patentably distinct claims 1 and 8, respectively, and are further distinguishable over the cited reference, are also believed to be allowable over the cited reference. Withdrawal of the rejection of claims 1-3 and 8-12 under 35 U.S.C. §102(b), and allowance of claims 1-3 and 8-12, are respectfully requested.

**Claim Rejections under 35 U.S.C. § 103**

Claims 1-5, 8-14, 17, and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Neumann, U.S. Patent No. 6,693,664 and Roberts. Amended independent claim 1 recites "an inspection system including at least a camera with the ability to selectively readout a number of rows and columns, wherein the inspection system is configured to inspect semiconductor substrates". Amended independent claim 8 recites "an inspection device including at least a camera with the ability to selectively readout pixels of an imager of the camera, wherein the inspection device is

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configured to inspect semiconductor substrates". Independent claim 17 is directed to an automated method of inspecting a plurality of semiconductor die, and recites "reading out pixel data from the imager for each captured frame, the pixel data for each captured frame including a third number of rows of pixels that is less than the first number of rows of pixels and a fourth number of columns of pixels that is less than the second number of columns of pixels".

The Examiner acknowledged that Neumann does not teach or suggest a camera with the ability to selectively readout pixels as recited in independent claims 1 and 8, but indicated that Roberts discloses this limitation. (Office Action at para. no. 11, pages 12 and 15). The Examiner also acknowledged that Neumann does not teach or suggest "the pixel data for each captured frame including a third number of rows of pixels that is less than the first number of rows of pixels and a fourth number of columns of pixels that is less than the second number of columns of pixels", as recited in independent claim 17, but indicated that Roberts discloses this limitation. (Office Action at para. no. 11, pages 19-20).

Applicant respectfully submits that a *prima facie* case of obviousness of claims 1, 8, and 17 has not been established, because there is no suggestion to combine the cited references. The Federal Circuit has stated, "[i]n holding an invention obvious in view of a combination of references, there must be some suggestion, motivation, or teaching in the prior art that would have led a person of ordinary skill in the art to select the references and combine them in the way that would produce the claimed invention." *Karsten Manufacturing Corp. v. Cleveland Golf Co.*, 58 U.S.P.Q.2d 1286, 1293 (CAFC 2001).

The Examiner contends that one would be motivated to modify Neumann according to Roberts to speed up processing and reduce the buffer (see, e.g., Office Action at para. no. 11, pages 12-13). This disclosure in Roberts regarding speeding up processing does not provide a motivation to combine any arbitrary teaching of Roberts with any arbitrary reference in any arbitrary manner. This argument ignores the imaging

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and defect detection technique disclosed in Neumann, as addressed in further detail below.

Neumann discloses a system for detection of wafer defects using a focal plane assembly 30 that includes an array of twenty-four high-resolution (1940 x 1035 pixels) CCD devices 52 to produce images of about forty-eight million pixels. (See, e.g., Neumann at Abstract; col. 9, lines 39-45; col. 10, lines 49-60). The field of view of the imaging system disclosed in Neumann is substantially less than the size of the semiconductor die, so multiple forty-eight million pixel images of each die are captured. (See, e.g., Neumann at Figures 5B and 6, and corresponding description).

Roberts discloses an imaging device 10 with random access of image elements. (See, e.g., Roberts at Abstract). Roberts discloses that the imaging device includes 512 x 512 pixels, 200 x 200 pixels, or 128 x 128 pixels. (Roberts at col. 4, lines 47-51, and col. 12, line 42).

There is no teaching or suggestion in Roberts regarding a system, device, or method for inspecting semiconductor substrates or die. There is no teaching or suggestion in Roberts that the imaging device disclosed therein could or should be used in an inspection system or device. There is no teaching or suggestion in Neumann that the high-resolution, forty-eight million pixel focal plane assembly 30 disclosed therein, or any portion thereof, could or should be replaced by the low-resolution imaging device 10 disclosed in Roberts. Rather, Neumann teaches away from such a modification by repeatedly emphasizing the need for capturing very high-resolution images (e.g., 48 million pixels). (See, e.g. Neumann at col. 2, lines 44-46; col. 5, lines 34-36; col. 6, lines 1-6; col. 8, lines 25-28; col. 9, lines 40-45; col. 10, lines 48-60; and col. 11, lines 1-6). There is also no teaching or suggestion in Neumann that it would be desirable to use an imaging device with random access of image elements, such as that disclosed in Roberts. Rather, since the device in Neumann only images a small portion of each die at a time (see, e.g., Neumann at Figures 5B and 6, and corresponding description), and compares each such image to a corresponding image from an adjacent die, all of the

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captured image data is needed and used in the disclosed system for defect detection (See, e.g., Neumann at col. 18, lines 17-52), and there is no teaching or suggestion in Neumann that it would be desirable or even possible to only use a subset or window of the captured image data. In fact, with the system disclosed in Neumann, using only a subset or window of the captured image data of the die may result in missed defects or misregistration of the images to be compared.

In view of the above, independent claims 1, 8, and 17 are not taught or suggested by Neumann and Roberts. In addition, dependent claims 2-5, 9-14, and 18, which further limit patentably distinct claim 1, 8, or 17, are also believed to be allowable over the cited references. Withdrawal of the rejection of claims 1-5, 8-14, 17, and 18 under 35 U.S.C. §103(a), and allowance of claims 1-5, 8-14, 17, and 18, are respectfully requested.

Dependent claims 2-5, 9-14, and 18 are also further distinguishable over the cited references. For example, dependent claim 5 recites "wherein the controller is configured to program the camera to readout the specified number of rows and columns **based on a size of the semiconductor die.**" Dependent claim 14 recites "wherein the controller is configured to program the camera to readout the 2D window of pixels **based on a size of the semiconductor die.**" Dependent claim 18 recites "programming the camera to read out the number of rows of pixels and the number of columns of pixels **based on a size of the semiconductor die**". The Examiner acknowledged that Neumann does not teach or suggest the above-recited limitations of claims 5, 14, and 18. (Office Action at para. no. 11, pages 14, 18, and 21). Roberts also does not teach or suggest the above-recited limitations of claims 5, 14, and 18. There is no teaching or suggestion in Roberts regarding a system, device, or method for inspecting semiconductor substrates or die, let alone programming a camera to read out a number of rows based on a size of a semiconductor die.

Claims 6, 15, and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Neumann and Roberts, and further in view of Tsuneta et al., U.S.

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Patent No. 6,570,156 ("Tsuneta"). Dependent claims 6, 15, and 19, which further limit patentably distinct claims 1, 8, and 17, respectively, and are further distinguishable over the cited references, are also believed to be allowable over the cited references. Withdrawal of the rejection of claims 6, 15, and 19 under 35 U.S.C. §103(a), and allowance of claims 6, 15, and 19 are respectfully requested.

Claims 7, 16, and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Neumann and Roberts, and further in view of Isogai et al., U.S. Patent No. 6,457,232 ("Isogai"). Dependent claims 7, 16, and 20, which further limit patentably distinct claims 1, 8, and 17, respectively, and are further distinguishable over the cited references, are also believed to be allowable over the cited references. Withdrawal of the rejection of claims 7, 16, and 20 under 35 U.S.C. §103(a), and allowance of claims 7, 16, and 20 are respectfully requested.

### **CONCLUSION**

In view of the above, Applicant respectfully submits that pending claims 1-3, 5-12, and 14-20 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 1-3, 5-12, and 14-20 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(b)(c). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Jeff A. Holmen at Telephone No. (612) 573-0178, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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10/24/06

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Jeff A. Holmen

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CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as first class mail, in an envelope, address to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 24<sup>th</sup> day of October, 2006

By: \_\_\_\_\_

Name: Jeff A. Holmen

*Jeff A. Holmen*